



Exploring the radiation belt slot region

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The radiation belt "slot" region between magnetic L-shells of approximately 2-3 is called so because early observations, as represented by the NASA AP-8 and AE-8 radiation belt models, for example, indicated a paucity of energetic particles in comparison to the inner belt and outer zone. However, observations over the last few solar cycles have indicated that the slot region is far from sedate. Particle populations come and go as a result of magnetospheric wave and convection electric field activity, an extreme example being the March 1991 geomagnetic storm which created intense new belts lasting for months. To better characterize and understand the dynamics of the slot region the Air Force Research Laboratory is developing the Demonstrations and Science Experiment (DSX) satellite for flight in 2009 with a nominal 6000 km x 12000 km, mid-inclination orbit. DSX will carry several science payloads designed to: (1) measure the distribution of energetic particles, plasmas and electromagnetic fields; (2) validate models of Very Low Frequency (VLF) wave propagation and wave-particle interactions; and (4) investigate radiation effects on advanced spacecraft technologies. In this presentation the DSX mission concept, payload specifications and expected scientific and space weather application payoffs will be discussed.